

Infertility in NZ: Impact of delaying starting a family

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Sub-replacement fertility: Is this an issue for NZ?

Workshop, 26 October 2006

Focus

1. Biological constraints to fertility – lessons from ART
2. Impact of delaying starting a family

Historical marital fertility rates by woman's age

Menken et al, 1986

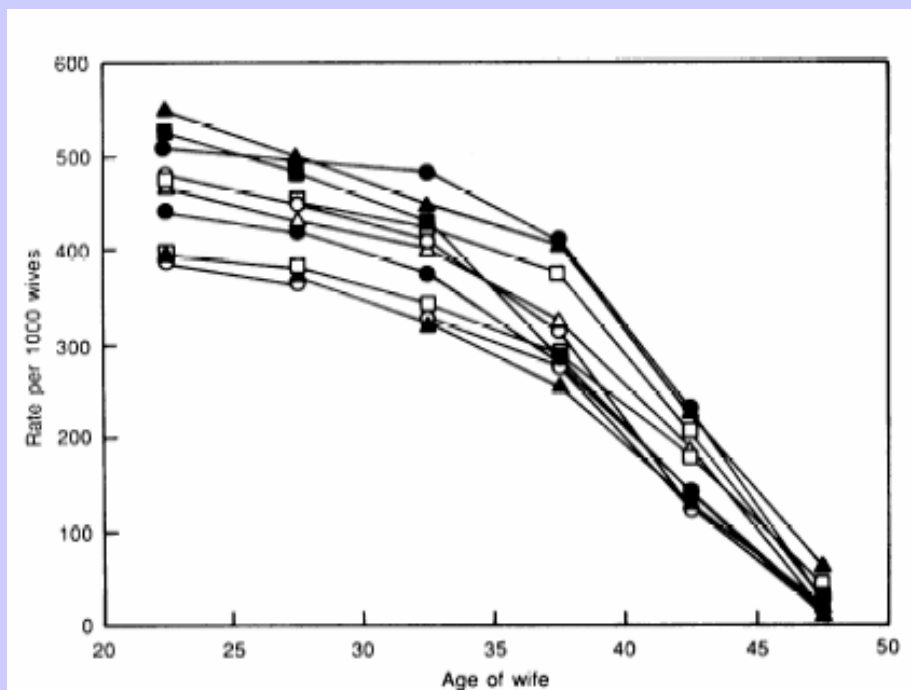


Fig. 1. Marital fertility rates by 5-year age groups (5). The ten populations (in descending order at age 20 to 24) are Hutterites, marriages 1921-30 (▲); Geneva bourgeois, husbands born 1600-49 (■); Canada, marriages 1700-30 (●); Normandy, marriages 1760-90 (○); Hutterites, marriages before 1921 (□); Tunis, marriages of Europeans 1840-59 (△); Normandy, marriages 1674-1742 (●); Norway, marriages 1874-76 (□); Iran, village marriages, 1940-50 (▲); Geneva bourgeois, husbands born before 1600 (○).

Women with at least one child by age of marriage

Menken et al, 1986

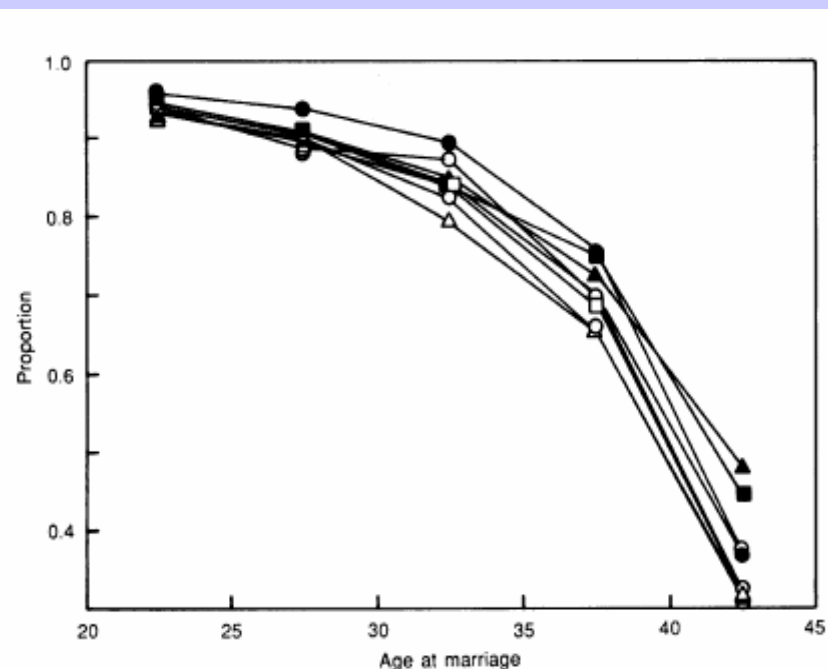
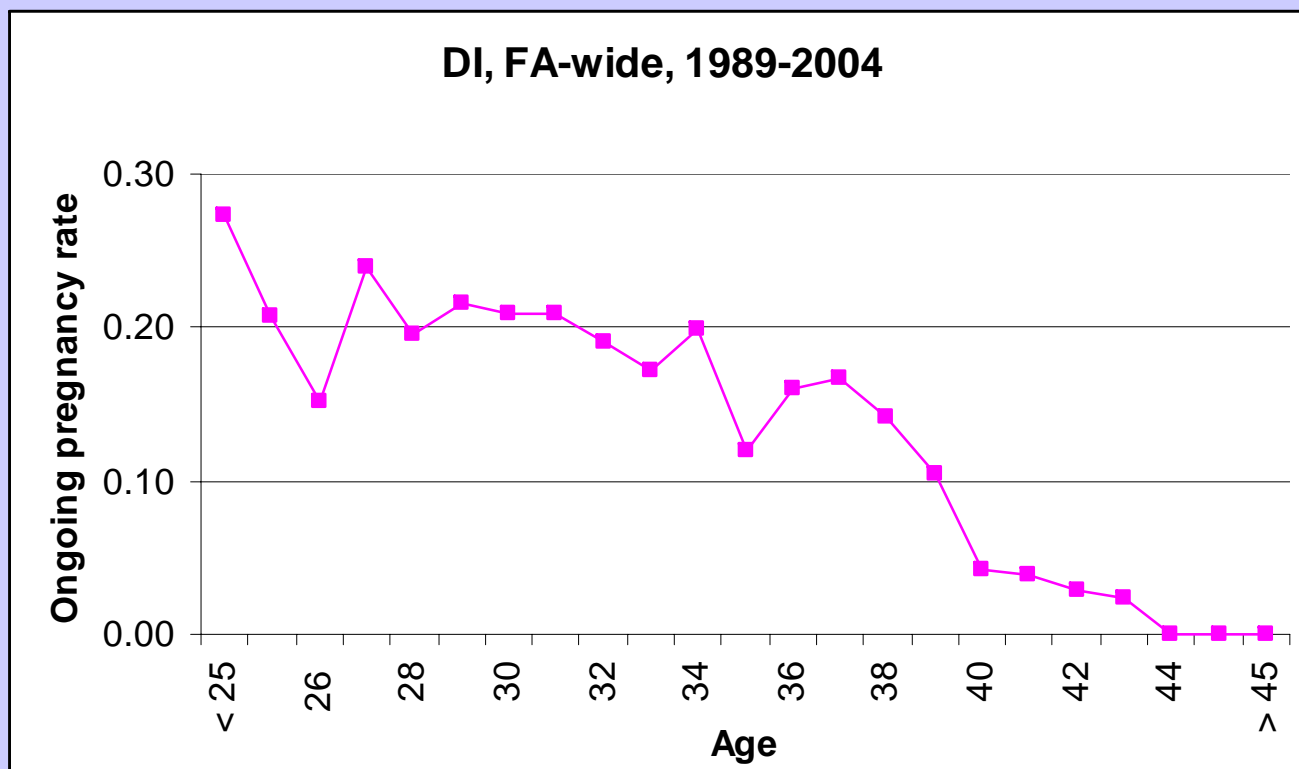


Fig. 2. Proportions having at least one child by 5-year age group at marriage and estimated typical pattern (—). The populations (in descending order at age 35 to 39) are Germany, 14 village genealogies, marriages 1750–1899 (●); England, family reconstitution of 16 rural parishes (mid-16th to early 19th centuries) by the Cambridge Group for the History of Population and Social Structure (■); Ireland, 1911 census (▲); typical pattern (—); England, family reconstitution for Quakers (○); Quebec, rural women born before 1876 (□); Scotland, 1911 census (○); and Quebec, 1946 census, rural women born 1876–85 (△).

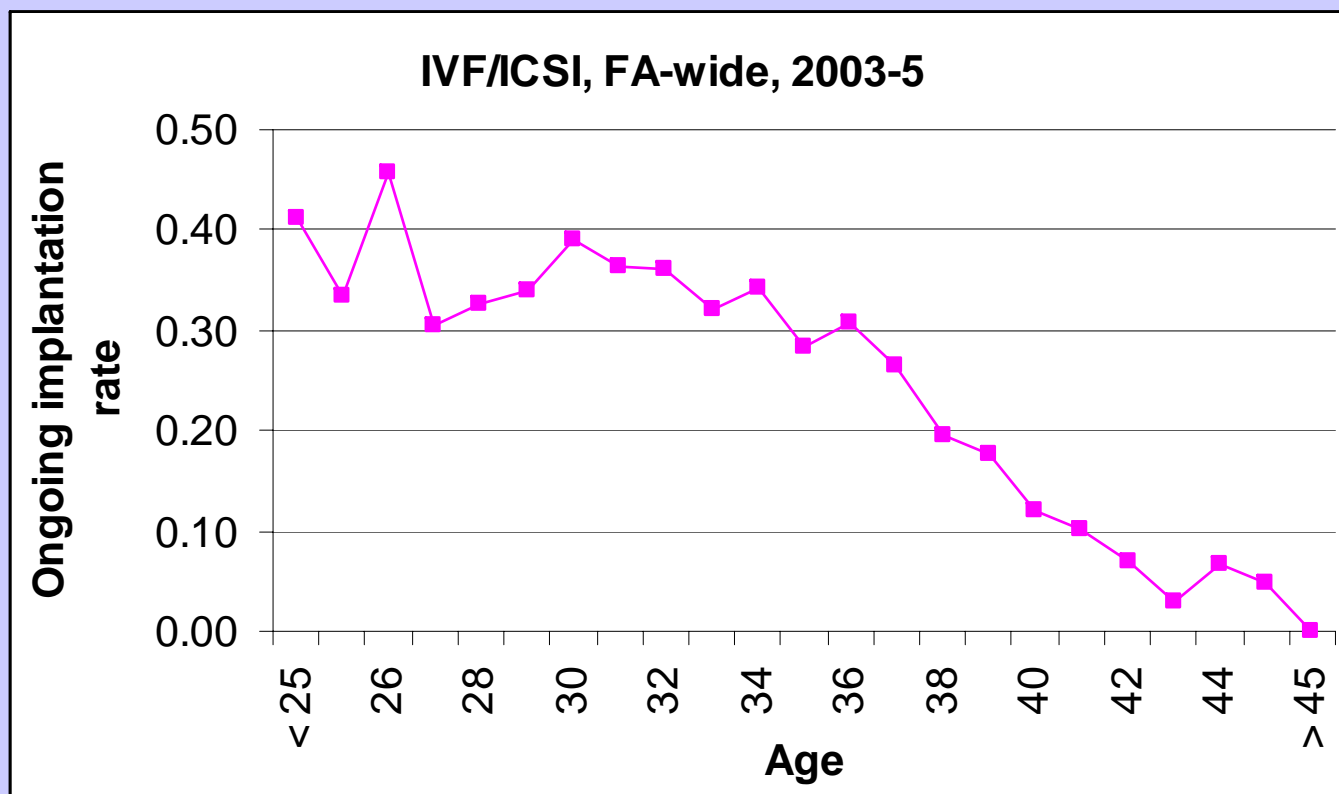
Decline in fecundability with age

Birth rate per cycle in Donor Insemination (DI), natural cycles, FA 1989-2004



Decline in fecundability with age

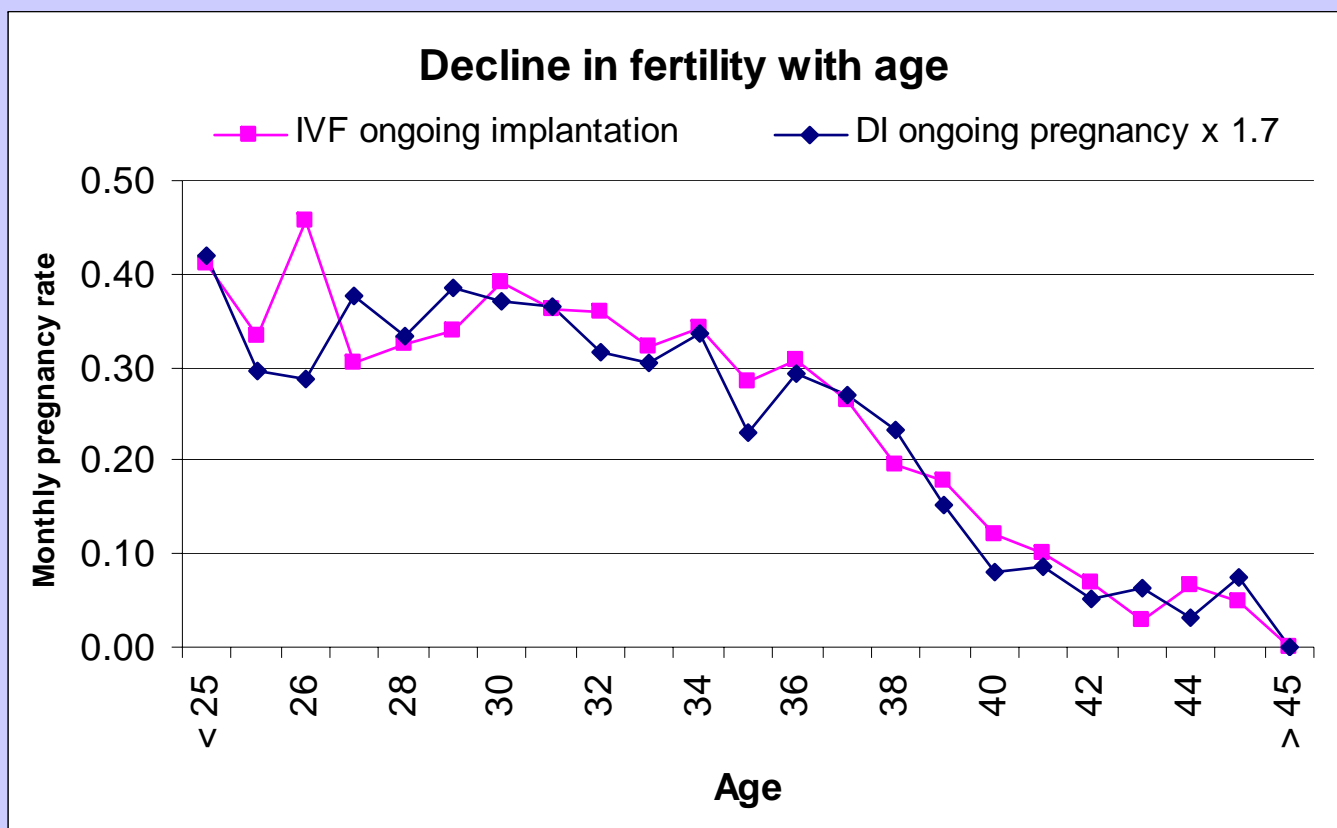
Ongoing implantation rate in IVF, FA 2003-2005



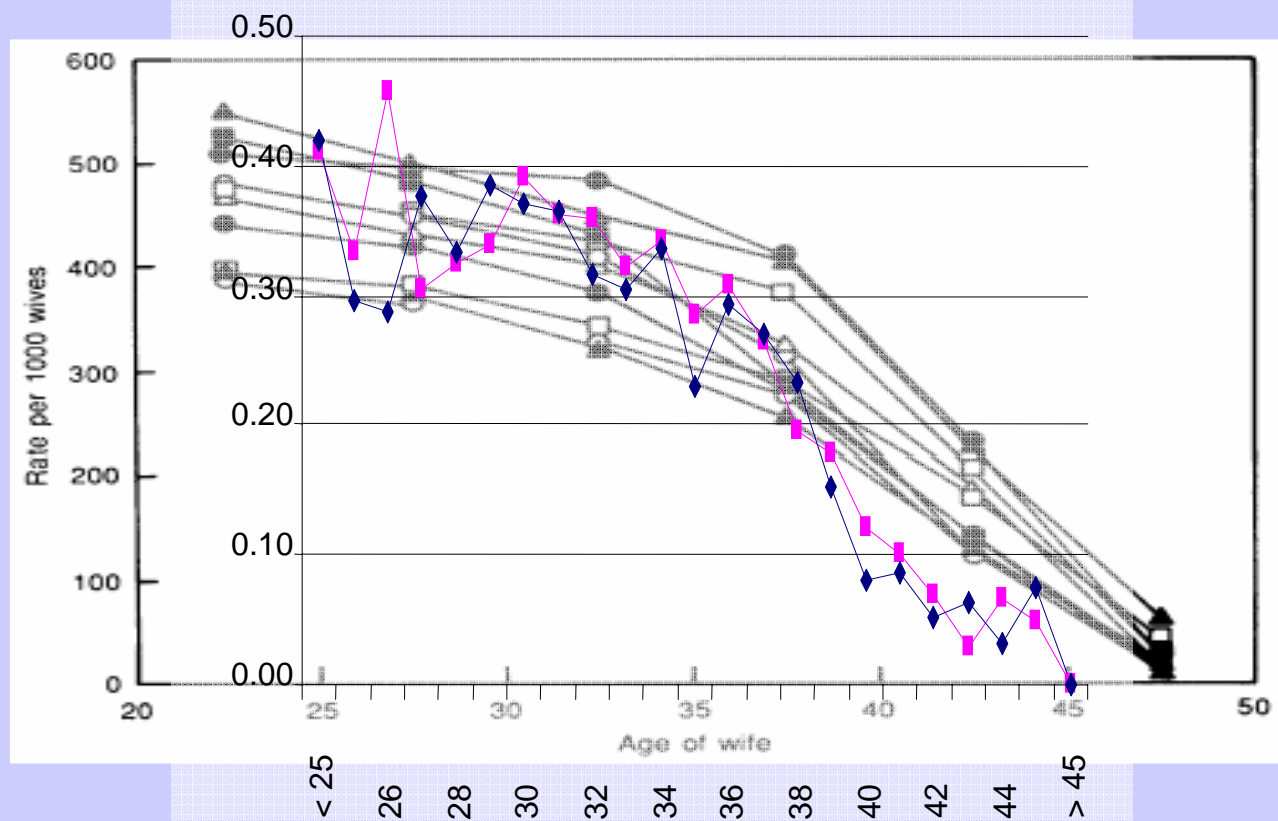
Decline in fecundability with age

IVF ongoing implantation rate, FA 2003-2005

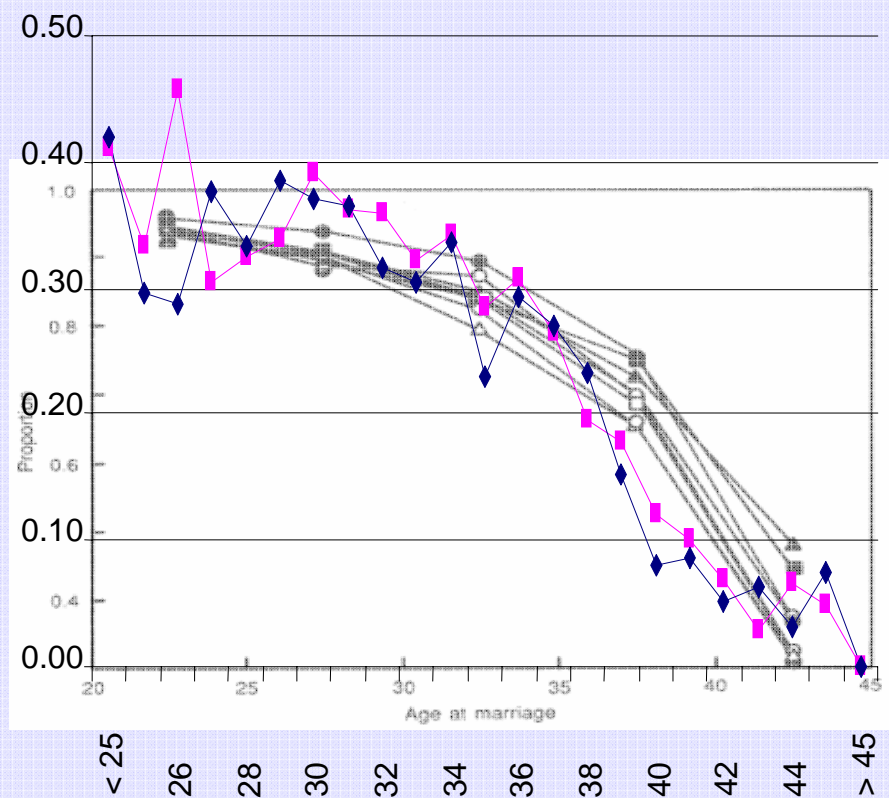
DI ongoing pregnancy rate, FA 1989-2004



Comparison of FA and Menken et al data

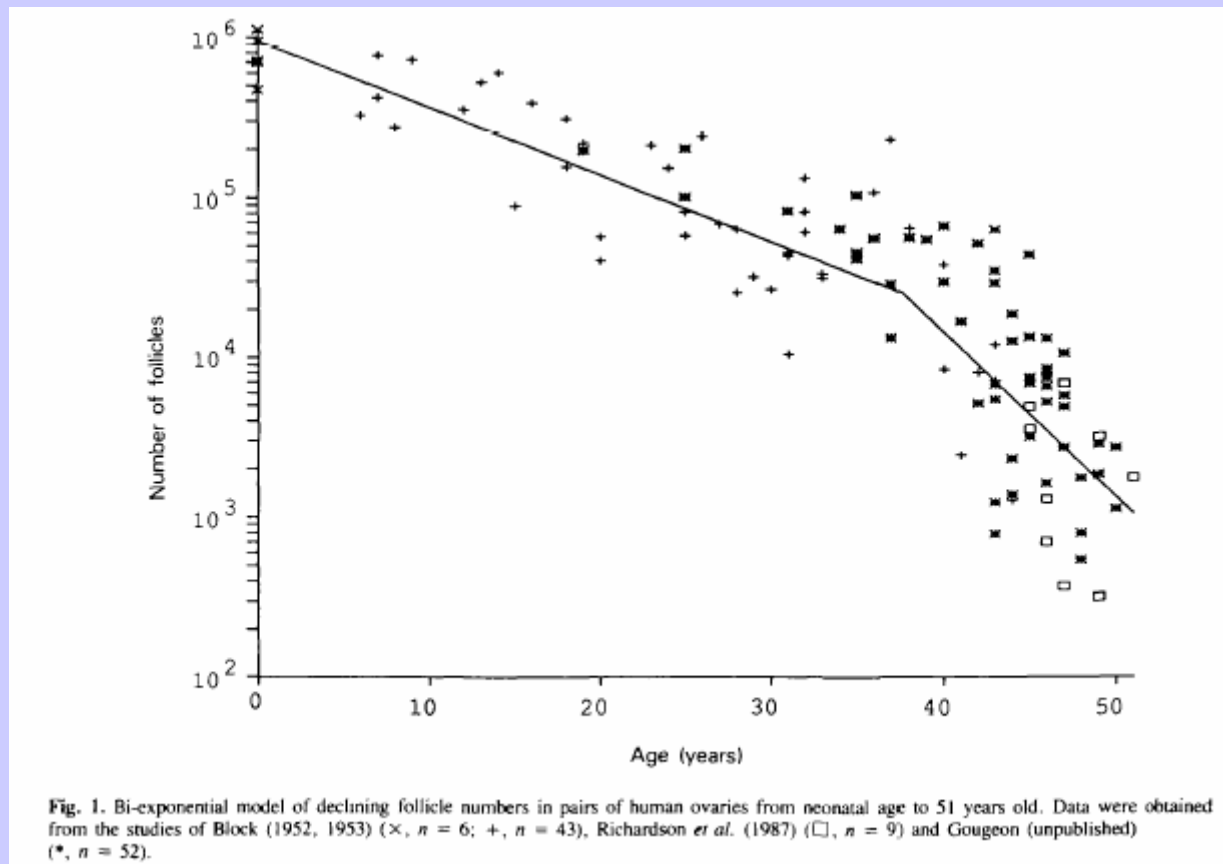


Comparison of FA and Menken et al data

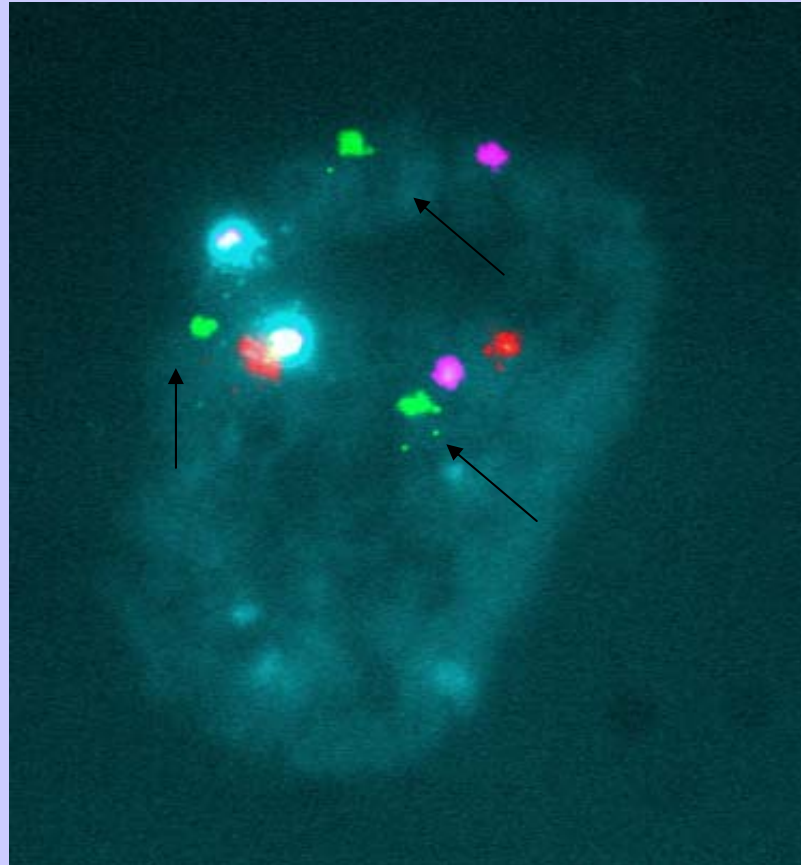


Loss of primordial follicles with woman's age

Faddy et al, 1992



Chromosomal aneuploidy



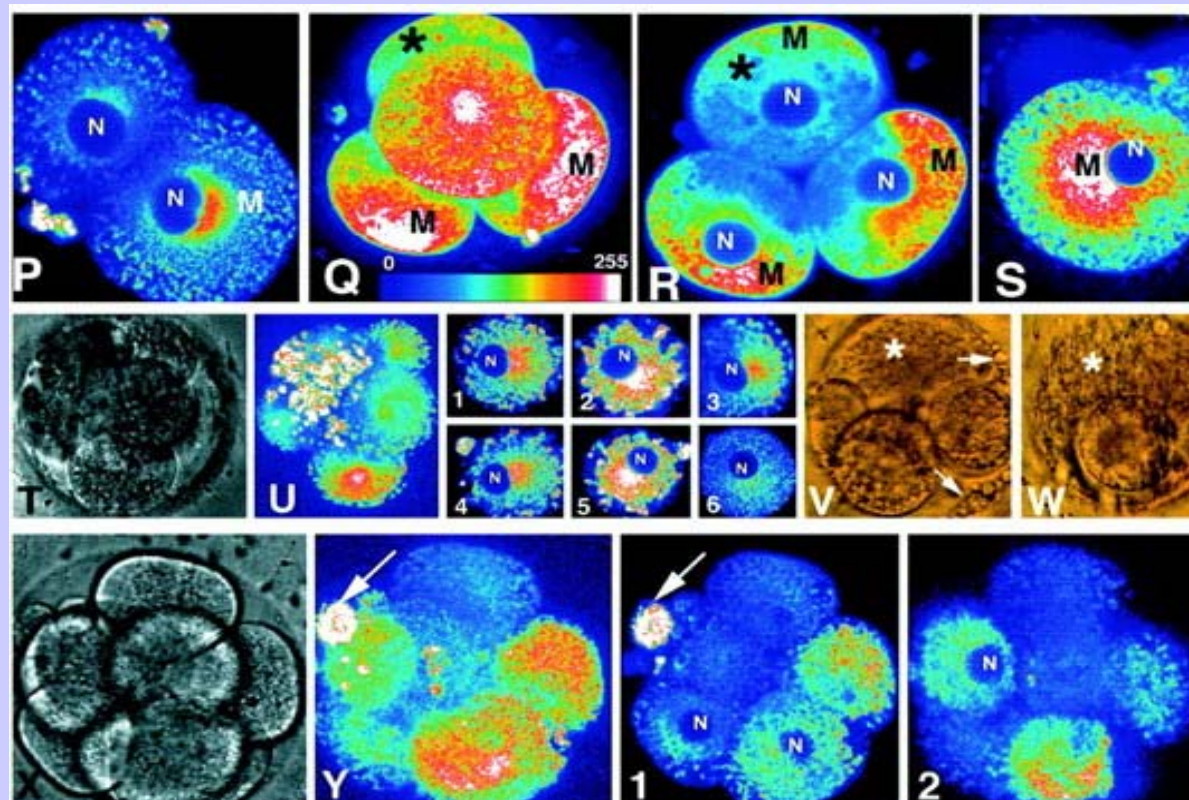
Incidence of aneuploidy

Various studies of spare embryos from IVF treatment:

- FISH (up to 10 chromosomes tested), normally developing embryos
 - 35-70% normal when one cell sampled
 - 40-75% normal when ≥ 2 cells sampled
- CGH (all chromosomes tested), normally developing embryos
 - 25% normal
 - 25% normal
 - 57% normal

Wilton (2005)

Mitochondrial distribution



Age-related loss of fertility

- Loss of fertility precedes the menopause by ~ 12 years
- ~ 10% of women enter the menopause in their early 40's
- ~ 1% of women enter the menopause in their 30's

→ Mostly due to starting off with fewer eggs

'Ovarian reserve'

- Predicting earlier/faster egg loss:
 - Follicle stimulating hormone (FSH) levels
 - Antral follicle scans ('Egg check')
 - Anti-Mullerian Hormone (AMH) levels
 - Poor response to ovarian stimulation in IVF
- Predicting later/slower egg loss:
 - No test known
- Nothing can improve the quality of eggs or delay the loss of eggs

Nature of infertility

Fecundability = chance of becoming pregnant per menstrual cycle or ART treatment

Infertility = not pregnant after 12 months of trying

- Not absolute
- 50% will conceive within the next 3 years
- Fecundability linked to severity of diagnosis

Cumulative pregnancy rates in couples with unexplained infertility

Hull et al, 1996

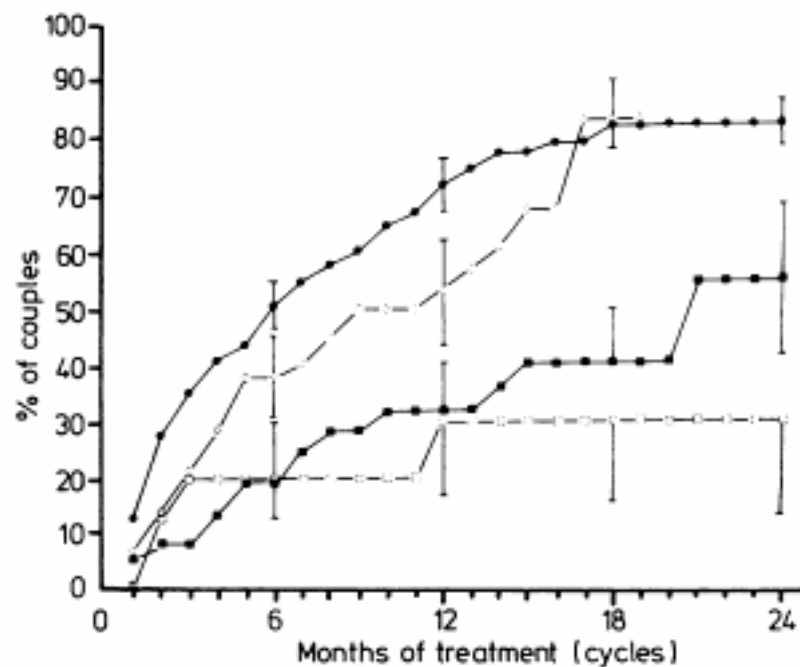


FIG 3—Cumulative rates of conception in couples with unexplained infertility related to duration of infertility at first attendance at clinic. Rates shown as: ●—● 1-2 years; ◇—◇ 2-3 years; ■—■ 3-5 years; □—□ ≥5 years. Standard error of proportions are given at six, 12, 18, and 24 months.

Efficacy of fertility treatment

- Treatment is available for all types of infertility
- IVF will enable > 90% of women (and men) to have children (age permitting)
- Donor Insemination (DI) and Donor Egg (DO) will allow nearly all the rest to have children (availability of donors permitting)

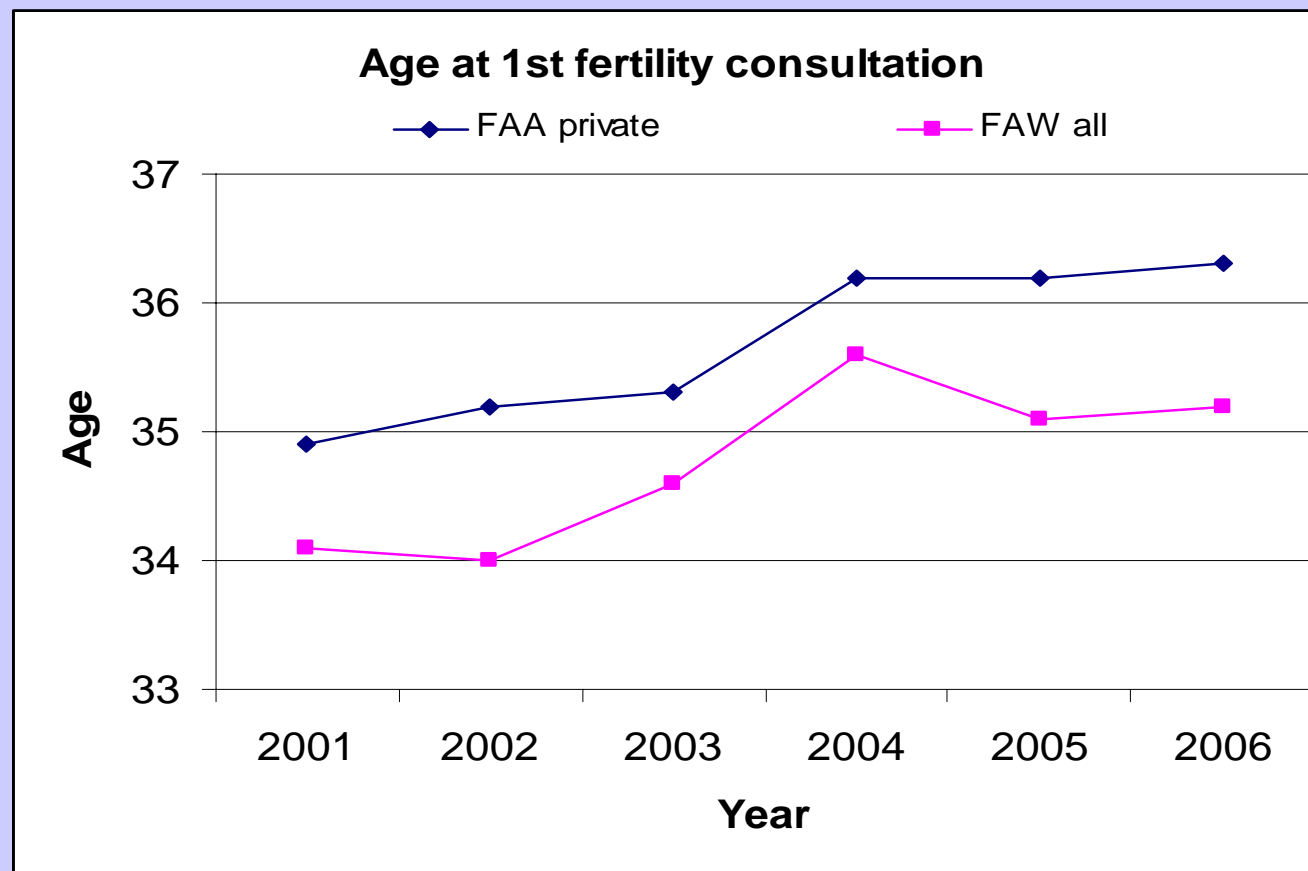
Publicly funded fertility treatment in NZ

- CPAC scoring, threshold 65 points
- Excludes those with a higher chance of conception without treatment
 - Shorter duration (5 year wait if unexplained infertility)
- Excludes those with lower chance of conception up treatment
 - Women ≥ 40 , smokers, BMI > 32 ,
- Fewer points if a couple have a child 12 or younger living at home
- Maximum of up to 2 IVF cycles in a relationship
- ~ 50% of all IVF privately funded
- Uptake of IVF in NZ ~ 50% that in Australia, France, Scandinavia, etc

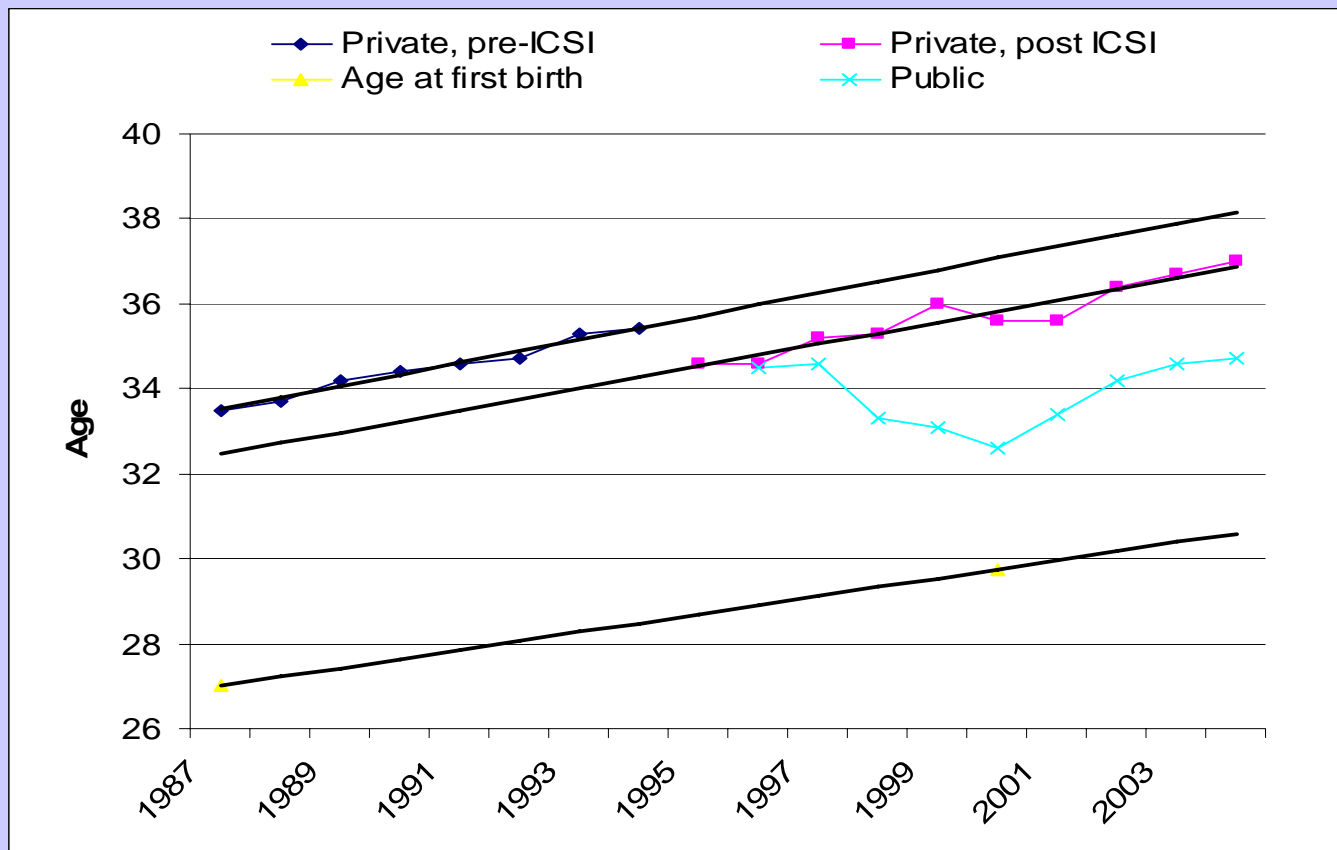
'Infertility management is time management'

- Chance of conception naturally
- Time available to try conception naturally
 - Woman's age
 - Estimate of ovarian reserve
 - Desired family size
- Chance of conception with treatment

Average age at 1st fertility consultation



Average age at IVF treatment in Auckland



Modelling impact of delaying starting a family

1. Effect of average age of starting trying for a family, and its distribution, using:
 - Number of couples wanting 0, 1, 2, 3 and > 3 children
 - Fecundability by age
 - Average interval between children

2. Impact of infertility, using:
 - Incidence of infertility by age (fNZ survey)
 - Average delay and its distribution in seeking help
 - Availability and uptake of fertility treatment